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Claims

1. A planar antenna (30) comprising:
a plurality of antenna elements (33, 41, 49) positioned relative to each other in a predetermined orientation, each of the plurality of antenna elements (33, 41, 49) being selectively electrically connectable to one or more of the other antenna elements,
a plurality of switches (56, 57) electrically connecting the plurality of antenna elements so that closing one of the switches causes at least two antenna elements to be electrically connected,
an antenna array (30) defined by the plurality of switches (56, 57) in combination with the plurality of antenna elements (33, 41, 49),
characterized in that
the antenna elements (33, 41, 49) are positioned on a planar substrate (31) in such a way that at least two different lobes (70, 72) of the antenna can be provided by activating different antenna elements (33, 41, 49) by means of the switches (56, 57) located on the antenna substrate itself.

2. A planar antenna according to claim 1,
characterized in that
the plurality of antenna elements (33, 41, 49) comprise patches (34 ,36, 38, 40, 42, 44, 46, 48, 50) on the planar substrate (31).

3. A planar antenna according to claim 2, **characterized in that** the patches (34 ,36, 38, 40, 42, 44, 46, 48, 50) comprise a central patch (50) which performs a coupling function to a microwave circuitry, such as a waveguide (10), a coaxial probe, via a hole, a slot coupling or any other type of coupling

4. A planar antenna according to claim 3, **characterized in that** all other patches (34 ,36, 38, 40, 42, 44, 46, 48) have a length which is optimized to make the respective patch resonate at a central frequency and a width which is adjusted to the impedance and radiation power of the antenna.

5. A planar antenna according to claims 2 to 4, **characterized in that** it comprises a left, a central and a right antenna element (33, 41, 49) each comprising three patches (34 ,36, 38, 40, 42, 44, 46, 48, 50), wherein the patches of each antenna element are electrically connected by vertical lines (58, 60, 62) and the left and right antenna elements (33, 41) respectively and the central antenna element (49) are electrically connectable by switches (56, 57).

6. A planar antenna according to any of the preceding claims, **characterized in that**

a waveguide (10) is provided for coupling to the planar antenna.

7. A planar antenna according to claim 6, **characterized in that** the waveguide (10) comprises a transition (18) to the planar antenna which is terminated by a waveguide flange (16).

8. A planar antenna according to claim 6 or 7, **characterized in that** the transition (18) comprises a "Doggy bone" filter (20) which reduces spurious radiation at harmonic frequencies.

9. A planar antenna according to claim 8, **characterized in that** the distance between the "Doggy bone" filter (20) and the plane of the planar antenna (30) is about a waveguide length when the waveguide (10) is mounted on the surface of the planar antenna (30).

10. A planar antenna according to any of the claims 6 to 9, **characterized in that** the waveguide (10) is enlarged in its larger dimension in order to ensure a constant electromagnetic field on its rear aperture and to provide impedance matching.

11. A planar antenna according to any of the claims 6 to 10,

characterized in that
the waveguide (10) comprises a rectangular aperture which is designed to provide enough energy to the central patch (50) and to ensure a good matching between the waveguide (10) and the planar antenna (30).

12. A planar antenna according to any of the preceding claims,
characterized in that
the switches are PIN diodes.

13. A planar antenna according to claim 12,
characterized in that
a path is provided for a DC current to polarize the PIN diodes and formed to have no influence on the antenna radiation pattern.

14. A planar antenna according to any of the claims 2 to 13,
characterized in that
at least connection-pads (52,54) for applying DC current to the switches and/or a part of the control lines (66,68) are covered by a material absorbing microwaves.

15. A planar antenna according to any of the preceding claims,
characterized by
a circuitry for controlling the planar antenna (30) by obtaining at least one Doppler Signal from at least one measurement device (100, 102) working with at least one lobe of the planar an-

tenna (30), processing the obtained Doppler Signals according to an algorithm and performing a high-speed switching between the configurations of the planar antenna (30) in accordance to the algorithm.

16. A planar antenna according to claim 15, **characterized in that** the circuitry comprises sample and hold circuits (114, 116, 118, 120) for sampling the obtained Doppler Signals.

17. A planar antenna according to claim 16, **characterized in that** the sample and hold circuits (114, 116, 118, 120) are synchronized with the high-speed switching.

18. A planar antenna according to any of the claims 15 to 17, **characterized in that** the circuitry comprises a digital signal processor for processing the at least one Doppler Signal.

19. A planar antenna according to claim 18, **characterized in that** the digital signal processor processes two Doppler signals obtained from two measurement devices (100, 102) and corresponding to two different lobes of the planar antenna and calculates from the Doppler signals an intermediate lobe by weighting the Doppler signals.

20. A planar antenna according to any of the claims 15 to 19,
characterized in that
the circuitry comprises an oscillator (108) which produces a sampling frequency signal (Φ) with an accuracy suitable for sampling.

21. A planar antenna according to any of the claims 15 to 20,
characterized in that
the circuitry is formed to perform sampling by pulse width modulation.

22. A planar antenna according to any of the preceding claims,
characterized in that
it is used in a Door opener sensor (152).

23. Device using a planar antenna according to any one of the claims 1 to 22, **characterized in that** the Door opener sensor (152) performs a parallel traffic rejection algorithm which processes the information received from the planar antenna in such a way that at least two different lobes (154, 156) of the planar antenna are analyzed in order to calculate the direction of a pedestrian moving in or near to the area covered by the Door opener sensor (152).